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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BUTLER, PATRICK	

ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 07/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/752,399	CHANG ET AL.	
	Examiner	Art Unit	
	Patrick Butler	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *24 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-8,11-17,20,22-27,29-34,36-38 and 41-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6-8,11-17,20,22-27,29-34,36-38 and 41-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 24 May 2006 has been entered.

Response to Amendment

The Applicant's Remarks, filed 24 May 2006, have been entered and have been carefully considered. Claims have not been amended.

Despite these advances, the invention as currently claimed is not found to be patentable for reasons herein below.

Information Disclosure Statement

The information disclosure statement filed 28 November 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. A line has been drawn through each reference not considered. Specifically:

- a legible copy of the following document was not provided (see right side of the document for text apparently cut off):

Wemy, F. and H.H. Chuah (May/June 1996). "CORTERRA PTT, A New Polymer for the Carpet Industry. An Overview of Extrusion, Texturing, Twisting and Heatsetting", Carpet & Rug Industry

- a copy of page two of the following document appears to be missing:

H.S. Brown, H.H. Chuah, "Poly(trimethylene terephthalate) - A New (Old) Fiber." Paper presented at The International Man-Made Fibres Congress, Dornbirn, Austria, September 25-27, 1996.

- The following document was indicated as not considered:

H.H. Chuah, H.S. Brown and P.A. Dalton, "Corterra™ Poly(Trimethylene Terephthalate) – A New Performance Carpet Fiber," International Fiber Journal, October, 1995.

It was indicated as not considered because it appears to be an exact duplication of the following document:

Chuah, H.H., H.S. Brown and P.A. Dalton (October, 1995), "CORTERRA Poly(Trimethylene Terephthalate) - A New Performance Carpet Fiber", International Fiber Journal.

If the documents are not duplicated in some aspect such as publication date or content, the Examiner would appreciate Applicant advising of such.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 4, 6-8, 11-13, 15-17, 20, 22-26, 29-34, 36-38, and 41-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howell et al. (International Publication Number WO 96/00808) in view of Hwo et al. (US Patent Application Publication No. 2002/0130433 A1), Wandel et al. (US Patent Application Publication No.

2002/0132116 A1) and Sun et al. (US Patent Application Publication No. 2002/0147298 A1).

With respect to claim 1, Howell teaches extruding poly(trimethylene terephthalate) to make BCF yarn. Howell teaches extruding poly(trimethylene terephthalate) with an intrinsic viscosity in the range of 0.6 to 1.3 (see page 2, lines 31-36), which reads on the claimed range of about 0.95 to about 1.04. The filaments are converged (see Figure 2, Ref. #12 - filaments approaching Ref. # 14) and cooled (see page 2, lines 37-39). Howell teaches that the yarn is drawn at least 800 m/min. (see page 3, lines 10-15), which reads on the claimed range of greater than 3,000 m/min. The filaments have a denier between 4 and 25 (see page 6, lines 3-7), which reads on the claimed range of filament denier greater than 10. The total denier, interpreted by the examiner to be synonymous with yarn denier, is between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier greater than 210. Howell teaches bulking the drawn filaments (see page 3, lines 10-15).

Howell does not teach the specific molecular weight, a specific melt viscosity of the extruded poly(trimethylene terephthalate), or the extent of speeds above 800 m/min.

Hwo teaches extruding poly(trimethylene terephthalate) with a draw speed of 2,450 to 10,000 m/min. (see page 2, paragraph 19), which reads on the claimed speed of greater than 3,000 m/min. It would have been obvious to combine Hwo's draw speed with Howell's process in order to maximize production speeds.

Howell in view of Hwo discloses the claimed invention except specific molecular weight and specific melt viscosity of the extruded poly(trimethylene terephthalate).

However, it is inherent in melt extrusion of synthetic yarn spinning of polymers that a high melt viscosity such as 350 up to about 700 Pascal at 250°C and 48.65 is needed to effectively produce yarn, and it is inherent that polymers have high number average molecular weight of 26,500 to about 40,000. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a polymer with characteristics such as a number average molecular weight at least about 26,500 to about 40,000 and a melt viscosity of 350 Pascal up to about 700 at 250°C and 48.65 per second shear rate to effectively extrude filaments to create yarn with desired denier at a desired speed, since it has been held that discovering an optimum value of a resultant effective variable involves only routine skill in the art. In re Boesch, 205 USPQ 215.

Moreover, Wandel teaches an example of poly(trimethylene terephthalate) with a melt viscosity of 325 Pa s, which demonstrates that melt viscosity of about 350 up to about 700 Pascal at 250°C and 48.65 per second shear rate is taught. In view Wandel's specification, the melt viscosity of 325 Pa s was an example, and could be optimized for resultant effective variables such as processing speeds and denier. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Wandel's optimizeable melt viscosity with the process taught by Howell in view of Hwo in order to effectively practice extrusion of poly(trimethylene terephthalate) for filaments.

Moreover, utilizing proper melt viscosity is an optimized value of a resultant effective variable and involves only routine skill in the art, as previously described.

Therefore, it would have been obvious to optimize the poly(trimethylene terephthalate) to have a melt viscosity of 350 up to about 700 Pascal at 250°C.

Moreover, Sun teaches using poly(trimethylene terephthalate) with a number average molecular weight of less than 40,000 (see Page 5-6, Paragraph 67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sun's molecular weight with the process taught by Howell in view of Hwo and Wandel because when a polyester composition is melt spun into fibers or filaments, long chain length linear polymer molecules are desirable (see Page 6, paragraph 70).

With respect to Claims 3 and 4, the range of number average molecular weight of 26,500 to about 40,000 as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of number average molecular weight of 27,500-40,000 (Claim 3) and 29,000-40,000 (Claim 4).

With respect to Claims 6, 7, and 8, the range of melt viscosity of about 350 up to about 700 Pascal at 250°C and 48.65 per second shear rate as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of melt viscosity of 400-700 (Claim 6), 450-700 (Claim 7), and 500-700 (Claim 8).

With respect to Claim 11, Howell teaches filaments with a denier between 4 and 25 (see page 6, lines 3-7), which reads on the claimed range of filament denier of at least 15.

With respect to Claims 12, Howell teaches the total (yarn) denier between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier at least 250.

With respect to Claims 15-17, Hwo teaches extruding poly(trimethylene terephthalate) with a draw speed of 2,450 to 10,000 m/min. (see page 2, paragraph 19), as previously described. This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 15), at least 4,000 m/min. (claim 16), and at least 5,000 m/min. (claim 17).

With respect to claim 20, Howell teaches coating the filaments with a spin finish (page 3, line 1), which reads on the claim language. The claim language allows for "optionally preintermingling the filaments", and because a process order is not claimed, it does not distinctly claim what intermingling is "pre-" to. The examiner interprets "pre-" to require intermingling be done before another portion the claimed process, which is taught by Howell by intermingling prior to wind-up (see page 15, lines 27-30).

With respect to claim 22, Howell teaches entangling the filaments (see page 15, lines 27-30).

With respect to claim 23, Howell teaches that the bulking of the drawn filaments is done in a 3-D manner (see page 3, lines 10-15).

With respect to claim 24, Howell teaches bulking the filaments by blowing and deforming with a hot-fluid jet bulking unit (see page 5, lines 5-12).

With respect to Claim 25, Howell teaches drawing at a ratio between 3 to 4.5 (see page 5, lines 2-4), which reads on the claimed range of 1.1-4.0. Also, Hwo

teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.1-4.0.

With respect to claims 29 and 30, Howell teaches extruding poly(trimethylene terephthalate) with an intrinsic viscosity in the range of 0.6 to 1.3 (see page 2, lines 31-36), which reads on the claimed range of about 0.98-1.04 (Claim 29), and 1.00-1.02 (Claim 30).

With respect to claim 31, Howell in view of Hwo, Wandel, and Sun teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described. Additionally, Howell teaches using poly(trimethylene terephthalate) with water content less than 100 ppm (page 14, lines 5-10). Howell teaches coating the cooled filaments with spin finish (see page 3, line 1 and see Fig. # 2 - filaments coated at Ref. # 18 after cooling in Ref. # 16). The claim language allows for "optionally preintermingling the filaments", and because a process order is not claimed, it does not distinctly claim what intermingling is "pre-" to. The examiner interprets "pre-" to require intermingling be done before another portion the claimed process, which is taught by Howell by intermingling prior to wind-up (see page 15, lines 27-30). Additionally, this intermingling is taken also to cause some degree of entangling of the filaments. Howell teaches heating the filaments to a temperature greater than the glass transition temperature of the filaments, but less than 200°C (see page 14, lines 20-24), which meets the claimed language in part (e) of the Claim. Howell teaches cooling the bulked continuous filaments to a temperature less than the glass transition temperature of the filaments (see Page 14, lines 32-34).

With respect to Claims 32 and 33, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (see page 11, lines 4-8), which reads on the claimed range of less than about 50 ppm (Claim 32) and less than about 40 ppm (Claim 33).

With respect to Claim 34, Howell discloses the claimed invention except for having the entangling unit before the cooling unit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the order of the units cooling and entangling, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

With respect to Claim 36-38, Hwo teaches extruding poly(trimethylene terephthalate) with a draw speed of 2,450 to 10,000 m/min. (see page 2, paragraph 19), as previously described. This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 36), at least 4,000 m/min. (claim 37), and at least 5,000 m/min. (claim 38).

With respect to claim 41 and 42, Howell teaches carpets made from poly(trimethylene terephthalate) yarns that are twisted, heat set, and then tufted into carpet (see page 7, lines 1-8), which reads on the claimed process (claim 41) of ply-twisting and heat-setting the filaments and claimed product (claim 42) of carpet made from the carpet.

With respect to Claims 43, Hwo teaches extruding poly(trimethylene terephthalate) with a draw speed of 2,450 to 10,000 m/min. (see page 2, paragraph 19),

as previously described. This draw speed range reads on the claimed speeds of greater than 3500 m/min. up to less than 5,000 m/min.

With respect to Claim 44, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (see page 11, lines 4-8). Howell teaches drawing at a ratio of 3 to 4.5 (see page 5, lines 2-4), which reads on the claimed range of 1.1-4.0. Also, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.1-4.0. Howell teaches the total (yarn) denier between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier at least 500.

The range of number average molecular weight of 26,500 to about 40,000 as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of number average molecular weight of 29,000-40,000.

The range of melt viscosity of about 350 up to about 700 Pascal at 250°C and 48.65 per second shear rate as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of melt viscosity of 450-700.

With respect to Claim 45, Hwo teaches using a single screw extruder to make poly(trimethylene terephthalate) (See [0025], [0038]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Hwo's single screw extruder in the poly(trimethylene terephthalate) extrusion process as taught by Howell in view of Hwo, Wandel, and Sun

because the art, Hwo, recognizes the suitability for an intended purpose, which is to extrude poly(trimethylene terephthalate).

With respect to Claim 46, Hwo teaches that temperature and dwell decrease moisture within the polymer (See [0026]). Hwo further teaches setting the dryer to 130 degrees C (See [0027]), which reads on the claimed range of 80-150 degrees C.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hwo's temperature for attaining desired moisture ppm with Howell's extrusion process because Howell does not explicitly teach how to achieve poly(trimethylene terephthalate) with less than 50 ppm moisture content and Hwo's method of drying the same polymer attains the desired moisture for extrusion process.

With respect to claim 47, Howell in view of Hwo, Wandel, and Sun teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described as applied to Claim 1 above.

Additionally, Howell teaches cooling the bulked continuous filaments (see Page 14, lines 32-34). Howell teaches intermingling prior to wind-up and winding up (see page 15, lines 27-30 and page 14, lines 35 and 36).

With respect to claim 13, Howell teaches the total (yarn) denier between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier at least 500.

With respect to Claim 26, Howell teaches drawing at a ratio between 3 to 4.5 (see page 5, lines 2-4), which reads on the claimed range of 1.2 to about 3.0. Also,

Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.2-3.0.

With respect to Claim 48, Howell teaches bulking the filaments by blowing and deforming with a hot-fluid jet bulking unit (texturing nozzle) (see page 3, lines 10-15; page 5, lines 5-12 and 19-22; Fig. 2, Ref. No. 24).

With respect to Claims 49-51, Hwo teaches extruding poly(trimethylene terephthalate) with a draw speed of 2,450 to 10,000 m/min. (see page 2, paragraph 19), as previously described. This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 49), greater than 4,000 m/min. (claim 50), and greater than 3500 m/min. up to less than 5,000 m/min. (claim 51).

With respect to Claim 52, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.4-2.2.

With respect to claims 53 and 54, Howell teaches extruding poly(trimethylene terephthalate) with an intrinsic viscosity in the range of 0.6 to 1.3 (see page 2, lines 31-36), which reads on the claimed range of about 1.00-1.02 (Claim 53), and about 0.95-1.02 (Claim 54).

With respect to Claim 55, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (see page 11, lines 4-8).

Claims 14, 27, and 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Howell et al. (International Publication Number WO 96/00808) in view of Hwo et al. (US Patent Application Publication No. 2002/0130433 A1), Wandel et al. (US Patent Application Publication No. 2002/0132116 A1) Sun et al. (US Patent Application

Publication No. 2002/0147298 A1) as applied to claim 50 above, and further in view of Burton et al. (US Patent No. 5,804,115).

With respect to claim 56, Howell in view of Hwo, Wandel, and Sun teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described as applied to Claim 50 above.

Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (see page 11, lines 4-8). Howell teaches winding up (see page 14, lines 35 and 36). To the extent that an apparatus is performing the winding-up of the filaments, it is a wind-up machine. Howell teaches drawing at a ratio of 3 to 4.5 (see page 5, lines 2-4), which reads on the claimed range of 1.1-4.0. Also, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.1-4.0. Howell teaches the total (yarn) denier between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier at least 500.

The range of number average molecular weight of 26,500 to about 40,000 as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of number average molecular weight of 29,000-40,000.

The range of melt viscosity of about 350 up to about 700 Pascal at 250°C and 48.65 per second shear rate as previously described in the discussion of Howell et al. in view of Hwo et al., Wandel et al., and Sun et al. above reads on the claimed range of melt viscosity of 450-700.

Hwo teaches using a single screw extruder to make poly(trimethylene terephthalate) (See [0025], [0038]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Hwo's single screw extruder in the poly(trimethylene terephthalate) extrusion process as taught by Howell in view of Hwo, Wandel, and Sun because the art, Hwo, recognizes the suitability for an intended purpose, which is to extrude poly(trimethylene terephthalate).

Howell in view of Hwo, Wandel, and Sun does not explicitly teach that the BCF fibers are cooled with a cooling drum.

Burton teaches that a cooling drum is used to cool poly(trimethylene terephthalate) fibers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Burton's cooling drum to cool the poly(trimethylene terephthalate) filaments as taught by Howell in view of Hwo, Wandel, and Sun because methods of cooling are interchangeable to the extent that a cooling drum or other methods of cooling can be used to cool poly(trimethylene terephthalate) filaments (see col. 8, lines 8-16)

With respect to Claim 14, Howell teaches the total (yarn) denier between 700 and 5,000 (see page 6, lines 3-7), which reads on the claimed range of yarn denier at least 1000.

With respect to Claim 27, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.4-2.2.

Claims 1, 3, 4, 6-8, 11-13, 15-17, 20, 22-26, 29-34, 36-38, 41-44, 47-51, and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (International Publication Number WO 99/19577) in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005).

Scott et al. incorporates Howell et al. (US Patent Number 5,645,782) by reference (see page 11, lines 16 and 17) in accordance with 31 CFR 1.57 (b).

With respect to claim 1, Howell teaches extruding poly(trimethylene terephthalate) to make BCF yarn. Howell teaches extruding poly(trimethylene terephthalate) with an intrinsic viscosity in the range of 0.6 to 1.3 (see col. 2, lines 1-6), which reads on the claimed range of about 0.95 to about 1.04. The filaments are converged (see Figure 2, Ref. # 12 - filaments approaching Ref. # 14) and cooled (see col. 2, lines 7-9). The filaments have a denier between 4 and 25 (see col. 3, lines 58-62), which reads on the claimed range of filament denier greater than 10. The total denier, interpreted by the examiner to be synonymous with yarn denier, is between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier greater than 210. Howell teaches bulking the drawn filaments (see col. 2, lines 19-24).

Scott teaches drawing to a speed of 4,000-6,000 m/min (see page 12, lines 15-18), which reads on the claimed range of greater than 3,000 m/min.

Scott lacks or does not expressly disclose polymers having the exact range of claimed intrinsic viscosity, number average molecular weight, and melt viscosity.

Admission discloses that polymers having the claimed intrinsic viscosity, number average molecular weight, and melt viscosity were commercially available from DuPont more than 1 year before the filing date of the instant application (Second Information Disclosure Statement, 28 November 2005, paragraph 2, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize DuPont PTT commercially available polymer as taught by Admission in the process of manufacturing PTT yarn as taught by Scott because it would have been useful to use commercially available polymer in a process requiring PTT polymer, particularly given the polymers' having the same intrinsic viscosity required by Scott/Howell.

With respect to Claims 3, 4, 6-8, 29, and 30, Admission discloses that polymers having the number average molecular weight and melt viscosity were commercially available from DuPont more than 1 year before the filing date of the instant application (Second Information Disclosure Statement, 28 November 2005, paragraph 2, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize DuPont PTT commercially available polymer as taught by Admission in the process of manufacturing PTT yarn as taught by Scott because it would have been useful to use commercially available polymer in a process requiring PTT polymer, particularly given the polymers' having the same intrinsic viscosity required by Scott/Howell.

With respect to Claim 11, Howell teaches filaments with a denier between 4 and 25 (see col. 3, lines 58-62), which reads on the claimed range of filament denier of at least 15.

With respect to Claims 12, Howell teaches the total (yarn) denier between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier at least 250.

With respect to Claims 15-17, Scott teaches drawing to a speed of 4,000-6,000 m/min (see page 12, lines 15-18). This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 15), at least 4,000 m/min. (claim 16), and at least 5,000 m/min. (claim 17).

With respect to claim 20, Howell teaches coating the filaments with a spin finish (col. 2, line 10), which reads on the claim language. The claim language allows for "optionally preintermingling the filaments", and because a process order is not claimed, it does not distinctly claim what intermingling is "pre-" to. The examiner interprets "pre-" to require intermingling be done before another portion the claimed process, which is taught by Howell by intermingling prior to wind-up (see col. 8, lines 62-65).

With respect to claim 22, Howell teaches entangling the filaments (see col. 8, lines 62-65).

With respect to claim 23, Howell teaches that the bulking of the drawn filaments is done in a 3-D manner (see col. 3, lines 28-36).

With respect to claim 24, Howell teaches bulking the filaments by blowing and deforming with a hot-fluid jet bulking unit (see col. 3, lines 5-12).

With respect to Claim 25, Howell teaches drawing at a ratio between 3 to 4.5 (see col. 3, lines 22 and 23), which reads on the claimed range of 1.1-4.0.

With respect to claim 31, Scott et al. in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005) teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described. Additionally, Howell teaches using poly(trimethylene terephthalate) with water content less than 100 ppm (col. 8, lines 5-10). Howell teaches coating the cooled filaments with spin finish (see col. 2, line 10 and see Fig. # 2 - filaments coated at Ref. # 18 after cooling in Ref. # 16). The claim language allows for "optionally preintermingling the filaments", and because a process order is not claimed, it does not distinctly claim what intermingling is "pre-" to. The examiner interprets "pre-" to require intermingling be done before another portion the claimed process, which is taught by Howell by intermingling prior to wind-up (see col. 8, lines 62-65). Additionally, this intermingling is taken also to cause some degree of entangling of the filaments. Howell teaches heating the filaments to a temperature greater than the glass transition temperature of the filaments, but less than 200°C (see col. 8, lines 20-24), which meets the claimed language in part (e) of the Claim. Howell teaches cooling the bulked continuous filaments to a temperature less than the glass transition temperature of the filaments (see col. 8, lines 31-33).

With respect to Claims 32 and 33, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (col. 6, lines 37-41), which reads on the claimed range of less than about 50 ppm (Claim 32) and less than about 40 ppm (Claim 33).

With respect to Claim 34, Howell discloses the claimed invention except for having the entangling unit before the cooling unit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the order of the units cooling and entangling, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

With respect to Claim 36-38, Scott teaches drawing to a speed of 4,000-6,000 m/min (see page 12, lines 15-18). This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 36), at least 4,000 m/min. (claim 37), and at least 5,000 m/min. (claim 38).

With respect to claim 41 and 42, Howell teaches carpets made from poly(trimethylene terephthalate) yarns that are twisted, heat set, and then tufted into carpet (see col. 4, lines 26-37), which reads on the claimed process (claim 41) of ply-twisting and heat-setting the filaments and claimed product (claim 42) of carpet made from the carpet.

With respect to Claims 43, Scott teaches drawing to a speed of 4,000-6,000 m/min (see page 12, lines 15-18). This draw speed range reads on the claimed speeds of greater than 3500 m/min. up to less than 5,000 m/min.

With respect to Claim 44, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (col. 6, lines 37-41). Howell teaches drawing at a ratio of 3 to 4.5 (see col. 3, lines 22 and 23), which reads on the claimed range of 1.1-

4.0. Howell teaches the total (yarn) denier between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier at least 500.

Admission discloses that polymers having the claimed number average molecular weight and melt viscosity were commercially available from DuPont more than 1 year before the filing date of the instant application (Second Information Disclosure Statement, 28 November 2005, paragraph 2, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize DuPont PTT commercially available polymer as taught by Admission in the process of manufacturing PTT yarn as taught by Scott because it would have been useful to use commercially available polymer in a process requiring PTT polymer, particularly given the polymers' having the same intrinsic viscosity required by Scott/Howell.

With respect to claim 47, Scott et al. in view of admitted prior art teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described as applied to Claim 1 above.

Additionally, Howell teaches cooling the bulked continuous filaments (see col. 2, lines 7-9). Howell teaches intermingling prior to wind-up and winding up (see col. 8, lines 62-65 and col. 8, lines 34 and 35).

With respect to claim 13, Howell teaches the total (yarn) denier between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier at least 500.

With respect to Claim 26, Howell teaches drawing at a ratio between 3 to 4.5 (see col. 3, lines 22 and 23), which reads on the claimed range of 1.2 to about 3.0.

With respect to Claim 48, Howell teaches bulking the filaments by blowing and deforming with a hot-fluid jet bulking unit (texturing nozzle) (see col. 2, lines 19-24; col. 3, lines 24-30 and 36-38; Fig. 2, Ref. No. 24).

With respect to Claims 49-51, Scott teaches drawing to a speed of 4,000-6,000 m/min (see page 12, lines 15-18). This draw speed range reads on the claimed speeds of greater than 3,500 m/min. (claim 49), greater than 4,000 m/min. (claim 50), and greater than 3500 m/min. up to less than 5,000 m/min. (claim 51).

With respect to claims 53 and 54, Admission discloses that polymers having the claimed intrinsic viscosity were commercially available from DuPont more than 1 year before the filing date of the instant application (Second Information Disclosure Statement, 28 November 2005, paragraph 2, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize DuPont PTT commercially available polymer as taught by Admission in the process of manufacturing PTT yarn as taught by Scott because it would have been useful to use commercially available polymer in a process requiring PTT polymer, particularly given the polymers' having the same intrinsic viscosity required by Scott/Howell.

With respect to Claim 55, Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (col. 6, lines 37-41).

Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (International Publication Number WO 99/19577) in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005), as applied to Claim 1 above and further in view of Hwo et al. (US Patent Application Publication No. 2002/0130433 A1).

With respect to Claim 45, Scott et al. in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005) teach extruding molten poly(trimethylene terephthalate) to make bulked yarn as previously described.

Scott does not explicitly teach using a single screw extruder.

Hwo teaches using a single screw extruder to make poly(trimethylene terephthalate) (See [0025], [0038]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Hwo's single screw extruder in the poly(trimethylene terephthalate) extrusion process as taught by Scott because the art, Hwo, recognizes the suitability for an intended purpose, which is to extrude poly(trimethylene terephthalate).

With respect to Claim 46, Hwo teaches that temperature and dwell decrease moisture within the polymer (See [0026]). Hwo further teaches setting the dryer to 130 degrees C (See [0027]), which reads on the claimed range of 80-150 degrees C.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hwo's temperature for attaining desired moisture ppm with Howell's extrusion process because Howell does not explicitly teach how to

achieve poly(trimethylene terephthalate) with less than 50 ppm moisture content and Hwo's method of drying the same polymer attains the desired moisture for extrusion process.

Claims 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (International Publication Number WO 99/19577) in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005), as applied to Claim 47 above and further in view of Hwo et al. (US Patent Application Publication No. 2002/0130433 A1).

With respect to Claim 52, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.4-2.2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hwo's drawing ratio with the process as taught by Scott in order to obtain desired crystallinity, orientation, tensile strength, and Young's modulus that accompany different drawing ratios (see Scott, page 11, lines 5-15).

Claims 14, 27, and 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (International Publication Number WO 99/19577) in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005) as applied to claim 50 above, and further in view of Hwo et al. (US Patent Application Publication No. 2002/0130433 A1).

With respect to claim 56, Scott et al. in view of admitted prior art (Second Information Disclosure Statement, paragraph 2, 28 November 2005) teach extruding

molten poly(trimethylene terephthalate) to make bulked yarn as previously described as applied to Claim 50 above.

Scott et al. incorporates Howell et al. (US Patent Number 5,645,782) by reference (see page 11, lines 16 and 17) in accordance with 31 CFR 1.57 (b).

Howell teaches using poly(trimethylene terephthalate) with water content less than 50 ppm (col. 6, lines 37-41). Howell teaches winding up (see col. 8, lines 34 and 35). To the extent that an apparatus is performing the winding-up of the filaments, it is a wind-up machine. Howell teaches drawing at a ratio of 3 to 4.5 (see col. 3, lines 22 and 23), which reads on the claimed range of 1.1-4.0. Howell teaches the total (yarn) denier between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier at least 500.

Scott teaches surrounding the new filaments with a hot tube (cooling drum) (see page 10, lines 4-6).

Admission discloses that polymers having the claimed number average molecular weight and melt viscosity were commercially available from DuPont more than 1 year before the filing date of the instant application (Second Information Disclosure Statement, 28 November 2005, paragraph 2, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize DuPont PTT commercially available polymer as taught by Admission in the process of manufacturing PTT yarn as taught by Scott because it would have been useful to use commercially available polymer in a process requiring

PTT polymer, particularly given the polymers' having the same intrinsic viscosity required by Scott/Howell.

Scott does not explicitly teach using a single screw extruder.

Hwo teaches using a single screw extruder to make poly(trimethylene terephthalate) (See [0025], [0038]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Hwo's single screw extruder in the poly(trimethylene terephthalate) extrusion process as taught by Scott because the art, Hwo, recognizes the suitability for an intended purpose, which is to extrude poly(trimethylene terephthalate).

With respect to Claim 14, Howell teaches the total (yarn) denier between 700 and 5,000 (see col. 3, lines 58-62), which reads on the claimed range of yarn denier at least 1000.

With respect to Claim 27, Hwo teaches drawing the filaments at a ratio of 0.7-3.0 (see page 2, paragraph 19), which reads on the claimed range of 1.4-2.2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hwo's drawing ratio with the process as taught by Scott in order to obtain desired crystallinity, orientation, tensile strength, and Young's modulus that accompany different drawing ratios (see Scott, page 11, lines 5-15).

Response to Arguments

Applicant's arguments filed 24 May 2006 have been fully considered but they are not persuasive.

Applicant argues with respect to the 35 USC 103 rejections. Applicant's arguments appear to be on the grounds that:

1) Hwo is directed to partially oriented yarn (POY), whereas Howell (WO96/00808) pertains to bulk continuous filament yarn (BCF). Hwo does not describe how to modify BCF processes to utilize its POY process.

2) Wandel and Sun do not teach how to use polymers of their characteristics in a BCF process.

3) The Examiner relies on only routine skill to be utilized to modify the processes to attain the characteristics.

4) It would only be "obvious to try" that could be relied upon, and the only way to arrive at the claimed invention would be hindsight.

The Applicant's arguments are addressed as follows:

1) The bulking of Howell (WO96/00808) is done after the drawing. Therefore, the yarn is not yet a BCF, at least when compared to the extent that it will have bulk at the end of the process/after the bulking step. As combined, the drawing to a high spinning speed of Hwo is intended to augment the high spinning speed of Howell (WO 96/00808) to spin the yarn even faster, but still have the speed reached before bulking. A motivation for doing so would be to attain fiber at a faster rate. Additionally, it may be seen that Hwo teaches equipment for the high speed winding that would be needed to make Howell's yarn faster.

If the bulking step is a concern of Applicant, it is noted that the bulking is not claimed to occur at the high spinning speed rate. For instance, bulking could occur at a much lower speed and still read on the claims.

2) Wandel and Sun are relied upon to show characteristics necessary polymer extrusion characteristics for successful practice. In fact, Sun's molecular weight is chosen particularly in view of Sun's teaching that when a polyester composition is melt spun into fibers or filaments, long chain length linear polymer molecules are desirable (see Page 6, paragraph 70).

3) Modifying Howell is not only optimizing productivity, it is also done via the teachings of the additional references as combined.

4) The obviousness would be to achieve the advantages of the combined references, such as utilizing their successful polymer characteristic practices and higher productivity practices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Butler whose telephone number is (571) 272-8517. The examiner can normally be reached on Mo.-Th. 7:30 a.m. - 5 p.m. and alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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6/23/06